Docket No.: 20798/0204621-US0
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Willhelm Melchert et al.

Application No.: 10/523,087 | Confirmation No.: 8536

Filed: February 2, 2005 | Art Unit: 2655

For: CONTROL CIRCUIT FOR AN ELECTROMAGNETIC DRIVE | Examiner: Z. Kitov

# APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on November 13, 2007, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

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|---|---|
| I. | Real Party In Interest |
| II | Related Appeals and Interferences |
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## I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Moeller GmbH

## II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## III. STATUS OF CLAIMS

### A. Total Number of Claims in Application

There are 14 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 1-6

2. Claims withdrawn from consideration but not canceled: None

3. Claims pending: 7-20

4. Claims allowed: None

5. Claims rejected: 7-20

C. Claims On Appeal

The claims on appeal are claims 7-20, which are reproduced in the **Claims Appendix**.

## IV. STATUS OF AMENDMENTS

Applicant filed an Amendment After Final Rejection on September 7, 2007. The Examiner responded to the Amendment After Final Rejection in an Advisory Action mailed October 1, 2007. Appellants did not amend the claims in the After Final Amendment.

Accordingly, the claims enclosed herein as Appendix A incorporate the amendments to claims as indicated in an Amendment to a Non-Final Office Action (dated January 26, 2007) that was filed on May 21, 2007 as there were no amendments to the claims in the Amendment to the Final Office Action (dated September 7, 2007) that was filed on October 1, 2007. However, the claims in Appendix A do incorporate the amendments indicated in the paper filed by Applicant on May 21, 2007.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 7 relates to a control circuit for an electromagnetic operating mechanism. The control circuit includes a timer (e.g., 12 in Fig. 1; e.g., Specification, page 5, lines 21-23). The control circuit also includes a first electronic switching device (e.g., 16 in Fig. 1) that includes a voltage follower (e.g., Specification, page 5, line 27 to page 6, line 2). The first electronic switching device includes a first output connected in series with an operating coil of the electromagnetic operating mechanism (e.g., 4 in Fig. 1; e.g., Specification, page 5, line 27 to page 6, line 2). The first electronic switching device is configured to activate for a duration of a pickup phase of the electromagnetic operating mechanism after a control voltage has been applied via the timer (e.g., Specification, page 5, lines 24-25; page 5, line 27 to page 6, line 2; and page 6 lines 15-17). The control circuit also includes a second electronic switching device (e.g., 22 in Fig. 1) that includes a switching path connected in series with the operating coil and is turned on while the control voltage is present (e.g., Specification, page 6, lines 4-8). The control circuit also includes a rectifier circuit (e.g., 8 in Fig. 1) connected to a control input (e.g., 6 in Fig. 1). The rectifier circuit has second output and is configured to supply a smoothed operating voltage on the second output (e.g., Specification, page 5, lines 14-21). A step-down DC voltage converter is connected downstream of the rectifier circuit (e.g., 10 in Fig. 1); the step-down DC voltage converter has a third output and is configured to supply a smoothed holding voltage on the third output (e.g., Specification, page 5, lines 20-21). The control circuit also includes a voltage source (e.g., 14 in Fig. 1) that is controllable by the timer and is configured to activate the first electronic switching device by a pickup voltage (e.g., Specification, page 5, lines 24-25 and page 5, line 27 to page 6, line 2). The timer of the control circuit is activatable by ramping up of the operating voltage (e.g.,

Specification, page 5, lines 21-25). The operating coil and the switching path of the second electronic switching device form a series circuit that is connected to the first output (e.g., Specification, page 5, line 27 to page 6, line 7). The series circuit and the first electronic switching device are suppliable with the operating voltage (e.g., Specification, page 5, line 27 to page 6, line 7). The third output, the first output and the control input of the second electronic switching device are all interconnected, with the third output being interconnected via a forward biased isolation diode (e.g., Specification, page 6, line 4-7, and page 6, line 10-12).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether claims 7, 8, 10, 12-14, 16, and 19 should be rejected under 35 U.S.C. §103(a) as being unpatentable over a combination of European Patent Document EP 0 0091 648 to Van Liempd et al. ("Van Liempd et al."), French Patent Document FR 2,808,619 to Maier et al. ("Maier et al.") and U.S. Patent No. 4,178,619 to Seiler et al. ("Seiler et al.").

(2) Whether claims 9, 11, 15, 17, 18, and 20 should be rejected under 35 U.S.C. §103(a) as being unpatentable over a combination of Van Liempd et al., Maier et al., Seiler et al. and U.S. Patent No. 4,633,362 to Saunders.

## VII. ARGUMENT

Rejections of claims 7, 8, 10, 12-14, 16, and 19 under 35 U.S.C. §103(a):

Appellants respectfully submit that the combination of Van Liempd et al., Maier et al., and

Seiler et al. does not render claims 7, 8, 10, 12-14, 16, and 19 obvious under 35 U.S.C. §103(a).

Van Liempd et al. describes an energizer circuit for magnetic valves in metering devices that requires three separate direct current voltage sources: high voltage current U1, maintaining current source U2 and input current source U3. The energizing coil L of the magnetic valve is connected via two switch paths T3, T5 in series initially to a higher voltage trigger current source U1 and after opening of the valve to a maintaining current source U2 at a lower voltage. The changeover takes place via a timer (R, C, T1) or via a sensor circuit sampling the position of the moving magnetic core.

Maier et al. describes an electronic operating mechanism for electromagnetic circuit switching supplied by alternating current $U_N$, which is rectified by rectifier 4 into supply voltage $U_v$. A voltage divider 5 is connected to a microprocessor 6. Voltage regulator 8, which is controlled by microprocessor 6, is capable of operating in two different modes. In a first mode, the voltage regulator 8 allows the full supply voltage $U_v$ to pass through without regulation to coil 7 for a period of time. After a predetermined time elapses, the microprocessor 6 sends a signal to the voltage regulator 8, which then provides a reduced regulated voltage $U_{v'}$ to coil 7.

Seiler et al. describes a protective integrated circuit network to permit integration of a control circuit to switch an inductive load and to protect the integrated control circuit against inductive voltage kicks, voltage surges, and reverse polarity.

The invention described and claimed in the present application is directed to a control circuit for an electromagnetic operating mechanism that has an operating coil, a magnetic core and an armature. Independent claim 7 recites a control circuit for an electromagnetic operating mechanism that includes:

a timer;

a first electronic switching device including a voltage follower and including a first output connected in series with an operating coil of the electromagnetic operating mechanism, the first electronic switching device being configured to activate for a duration of a pickup phase of the electromagnetic operating mechanism after a control voltage has been applied via the timer;

a second electronic switching device including a switching path connected in series with the operating coil, the second electronic switching device being turned on while the control voltage is present;

a rectifier circuit connected to a control input, the rectifier circuit including a second output and being configured to supply a smoothed operating voltage at the second output;

a step-down DC voltage converter connected downstream of the rectifier circuit, the step-down DC voltage converter including a third output and being configured to supply a smoothed holding voltage at the third output; and

a voltage source controllable by the timer and configured to activate the first electronic switching device by a pickup voltage;

wherein:

the timer is activatable by a ramping up of the operating voltage;

the operating coil and the switching path of the second electronic switching device form a series circuit connected to the first output; the series circuit and the first electronic switching device are suppliable with the operating voltage; and

the third output, the first output, and a control input of the second electronic switching device are interconnected, the third output being interconnected via a forward biased isolation diode.

As described and shown in the specification, the claimed invention provides a low-power control circuit that has a low degree of complexity and is largely independent of input voltage. Paragraph [0006].

Appellants respectfully submit that the combination of Van Liempd et al., Maier et al., and Seiler et al. does not render independent claim 7 obvious for at least two reasons. First, Appellants submit that the combination fails to suggest at least the feature of a third output (i.e. output of a voltage follower), first output (i.e. output of the first switching device) and the control input of the second switching device being interconnected. This three-way interconnection recited in claim 7

enables the advantages described in the appellants specification, for example energizing the coil with either a pick-up voltage or a holding voltage in the manner described that are each derived from a single voltage source. Second, Appellants submit that the combination further fails to suggest the feature of a step-down DC voltage converter as recited in claim 7. Nor would these features -- missing from the combination of Van Liempd et al., Maier et al., and Seiler et al. -- have been obvious to a person having ordinary skill in the art at the time.

A. Combination Does not Suggest Three-way Interconnection

With regard to the first reason, the Examiner admits that Van Liempd et al. does not suggest such a three way interconnection. See Final Office Action at page 4. The Examiner deems Van Liempd et al. switch T5 to correspond to the first switching device and switch T3 to correspond to the second switching device. See Final Office Action at page 3. In contrast to the invention of independent claim 7, Van Liempd et al. teaches that the output of the first switch T5 is prevented from reaching the control input of the second switch T3. The control input of second switch T3 is instead connected to further switch T2, which is supplied with a separate voltage source U2 after it is passes through resistor R6. See Van Liempd et al. at Fig. 4.

The Examiner relies instead on the teaching of Seiler et al. of a four-layer triode 28 "similar to the second switch of Van Liempd et al., i.e. positioned between the solenoid and the ground terminal". See Final Office Action at page 4-5. As described in Seiler et al., in normal operation, the triode 28 is not triggered. However, if sudden voltages are externally introduced into the circuit, the triode 28 will fire when a certain predetermined current will flow through resistor 24'. See Seiler et al., column 4, lines 45-60. The control input of diode 28 is connected (over resistor 24') to

ground and to an output of Seiler switch 11. See Seiler et al. Figs. 3-5. Thus, the purpose of the Seiler triode 28 is to protect the circuit against sudden external voltages, and does not perform a function similar to the second switch of Van Liempd et al.

Moreover, even if the substitution were to be made as asserted by the Examiner, the control input of Seiler triode 28 would not be interconnected with both an output of a voltage converter and an output of the first switching device as per claim 7. Instead, the control input of the Seiler switch 28 is connected (over resistor 24') to an output of Seiler switch 11, which in no way corresponds to the first switching device of Van Liempd et al. (deemed by the Examiner to be Van Liempd switch T5). Seiler switch 11 is connected at its input to the coil and its output to the ground connection, whereas the Van Liempd switch T5 is connected at its input to a high voltage source U1 and at its output to the coil L. Claim 7 specifies that the first output of the first switching device is connected to the coil. Thus, for that additional reason, the Seiler triode 28 cannot correspond to the second switch of claim 7 and the combination with Van Liempd et all. and Maier et al. does not suggest the three-way interconnection as recited in claim 7.

B. Combination Does not Suggest Step-down DC Voltage Converter

With regard to the second reason, Appellants respectfully submit that the combination of Van Liempd et al., Maier et al., and Seiler et al. fails to suggest at least the feature of a step-down DC voltage converter as recited in claim 7, and furthermore that a person of ordinary skill in that art could not have combined the elements of Van Liempd et al. and Maier et al. according to known methods to yield predictable results.

The Examiner admits that Van Liempd et al. does not suggest a rectifier circuit or a step-down converter as recited in independent claim 7, but asserts that it would have been obvious to combine the teachings of Meier et al. (rectifier 4 and voltage regulator 8) to arrive at the claimed invention "because (a) as Maier states [0003], the coil driving circuit is to be used in the power distribution networks 'bang-bang' controllers, which as well known in the art, operate with the AC input signals, which are to be rectified in order to be processed by the microprocessor, such as element 6 in Fig. 1, and (b) the step-down voltage converter is be used to convert the high value AC voltage typical for the power distribution networks to the low voltage value suitable for a power supply of the microprocessor". See Final Office Action dated July 10, 2007, at page 4.

Appellants disagree with the Examiner's assertions. First, even if the combination were proper, Appellants respectfully submit that a person of ordinary skill in the art would not equate a step-down DC voltage converter as recited in claim 7 and described in the specification with the Maier et al. voltage regulator 8, which functions quite differently. Voltage regulator 8 of Maier et al. is a complex unit that cannot function to regulate the voltage independently of microprocessor 6. In other words, if voltage regulator 8 does not receive a signal from microprocessor 6, it does not regulate voltage $U_v$ at all, but instead passes voltage $U_v$ directly to the coil. See Fig. 1 and the text describing the circuit of Fig. 1.

Nor is it proper to combine elements from Van Liempd et al. and Maier et al. where each element being combined would not perform the same function in combination as it did separately. The voltage regulator 8 of Maier et al. would clearly not perform the same function in combination with Van Liempd et al. as it performs in Maier et al. In fact, if substituted alone into the Van Liempd et al. circuit (i.e. without microprocessor 6) it would not regulate the voltage at all, but

simply pass through input voltage to its output. If the Examiner suggests instead that both voltage regulator 8 and microprocessor 6 be combined with Van Liempd et al., they likewise would not function in the same way as those element function in Meier et al., since the microprocessor 6 simultaneously acts as a timer and switches on the coil 7 via switch 9, and is connected to voltage divider 5.

For at least the reasons discussed above, Appellants submit that the rejections to independent claim 7, and thus also to dependent claims 8, 10, 12-14, 16, and 19 under 35 U.S.C. §103(a) are improper and should be reversed.

Rejections of claims 9, 11, 15, 17, 18, and 20 under 35 U.S.C. §103(a):

Appellants respectfully submit that the combination of Van Liempd et al., Maier et al., Seiler et al. and Saunders do not render claims 7, 8, 10, 12-14, 16, and 19 obvious under 35 U.S.C. §103(a).

Appellants respectfully submit that Saunders does not cure the deficiency of the Van Liempd, Maier, and Seiler combination. Specifically, Saunders also fails to recite at least the interconnection and step-down DC voltage converter as recited in independent claim 7.

Accordingly, Appellants submit that the rejections to claims 8, 11, 15, 17, 18, and 20 under 35 U.S.C. § 103(a) are improper and should be reversed.

VIII. CLAIMS

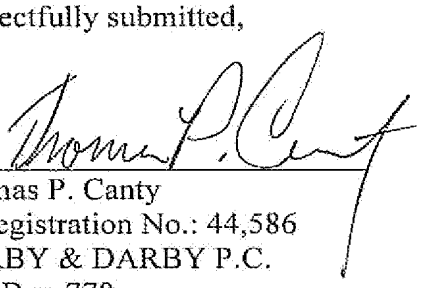
A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Applicant on May 21, 2007.

**Conclusion**

For the foregoing reasons, the final rejection of claims 7-20 should be reversed. Appellants respectfully request that the application be remanded to the Primary Examiner with instruction to withdraw the rejections under 35 U.S.C. 103(a), and pass the case to the allowance.

Dated: January 4, 2008

Respectfully submitted,

By 

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## APPENDIX A

**Claims Involved in the Appeal of Application Serial No. 10/523,087**

Claims 1-6 (canceled)

Claim 7 A control circuit for an electromagnetic operating mechanism, the control circuit comprising:

a timer;

a first electronic switching device including a voltage follower and including a first output connected in series with an operating coil of the electromagnetic operating mechanism, the first electronic switching device being configured to activate for a duration of a pickup phase of the electromagnetic operating mechanism after a control voltage has been applied via the timer;

a second electronic switching device including a switching path connected in series with the operating coil, the second electronic switching device being turned on while the control voltage is present;

a rectifier circuit connected to a control input, the rectifier circuit including a second output and being configured to supply a smoothed operating voltage at the second output;

a step-down DC voltage converter connected downstream of the rectifier circuit, the step-down DC voltage converter including a third output and being configured to supply a smoothed holding voltage at the third output; and

a voltage source controllable by the timer and configured to activate the first electronic switching device by a pickup voltage;

wherein:

the timer is activatable by a ramping up of the operating voltage;

the operating coil and the switching path of the second electronic switching device form a series circuit connected to the first output;

the series circuit and the first electronic switching device are suppliable with the operating voltage; and

the third output, the first output, and a control input of the second electronic switching device are interconnected, the third output being interconnected via a forward biased isolation diode.

Claim 8 The control circuit as recited in claim 7 wherein the electromagnetic switching device includes an operating mechanism.

Claim 9 The control circuit as recited in claim 7 wherein the timer includes an integrating RC element.

Claim 10 The control circuit as recited in claim 7 wherein the timer includes a differentiating RC element.

Claim 11 The control circuit as recited in claim 9 wherein the RC element is combined with a voltage-limiting device.

Claim 12 The control circuit as recited in claim 10 wherein the RC element is combined with a voltage-limiting device.

Claim 13 The control circuit as recited in claim 7 wherein the voltage source includes a voltage-limiting circuit and a threshold circuit having an input side, the voltage-limiting circuit being supplied with the operating voltage and having a fourth output operatively connected to a switching path of the threshold circuit, the input side of the threshold circuit being connected to the timer.

Claim 14 The control circuit as recited in claim 7 further comprising a free-wheeling device connected in parallel with the switching path of the second electronic switching device.

Claim 15 The control circuit as recited in claim 9 wherein the voltage source includes a voltage-limiting circuit and a threshold circuit having an input side, the voltage-limiting circuit being supplied with the operating voltage and having a fourth output operatively connected to a switching path of the threshold circuit, the input side of the threshold circuit being connected to the timer.

Claim 16 The control circuit as recited in claim 10 wherein the voltage source includes a voltage-limiting circuit and a threshold circuit having an input side, the voltage-limiting circuit being supplied with the operating voltage and having a fourth output operatively connected to a switching path of the threshold circuit, the input side of the threshold circuit being connected to the timer.

Claim 17 The control circuit as recited in claim 11 wherein the voltage source includes a voltage-limiting circuit and a threshold circuit having an input side, the voltage-limiting circuit being supplied with the operating voltage and having a fourth output operatively connected to a switching path of the threshold circuit, the input side of the threshold circuit being connected to the timer.

Claim 18 The control circuit as recited in claim 9 further comprising a free-wheeling device connected in parallel with the switching path of the second electronic switching device.

Claim 19 The control circuit as recited in claim 10 further comprising a free-wheeling device connected in parallel with the switching path of the second electronic switching device.

Claim 20 The control circuit as recited in claim 11 further comprising a free-wheeling device connected in parallel with the switching path of the second electronic switching device.

## APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

## APPENDIX C

No related proceedings are referenced in II above, hence copies of decisions in related proceedings are not provided.